

# **The inverse problem for SEP propagation and generation in the inner Heliosphere, 3. In the frame of kinetic model**

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It is well known that the observed energy spectrum of solar energetic particles (SEP) and its change with time are determined by the energy spectrum in the source, by the time of SEP ejection into the solar wind and by the parameters of SEP propagation in the interplanetary space in dependence of particle energy. Here we continue our consideration of the inverse problem: on the basis of cosmic ray (CR) observations by the ground base detectors (by using of the coupling function method, see in monograph [1], Chapter 3) and detectors in the space to determine the energy spectrum of SEP in the source, the time of SEP ejection into the solar wind and the parameters of SEP propagation in the interplanetary space in dependence of particle energy. In [2] and [3] was considered the inverse problem for isotropic and anisotropic diffusion models of SEP propagation in the interplanetary space. In this paper we consider more complicated case - kinetic propagation model. This model is especially important for the beginning phase of SEP propagation in the interplanetary space. We suppose that after the start of SEP event, the energy spectrum of SEP at different moments of time is determined with a good accuracy in a broad interval of energies. We show that in this case the inverse problem also can be solved and obtained information on the energy spectrum in the source, on the time of SEP ejection into the solar wind and on the parameters of SEP propagation in the interplanetary space in dependence of particle energy. It is important that obtained results and reality of used model can be controlled by independent data on SEP energy spectrum in other moments of time (does not used at solving of inverse problem). On the basis of obtained results can be estimate the total release energy in the SEP event and made forecasting on the basis of very beginning stage of SEP event data.

Reference:

[1]. L.I. Dorman, Cosmic Rays in the Earth's Atmosphere and Underground, Kluwer Academic Publ., Dordrecht/Boston/London, 2004.

[2]. Lev I. Dorman, The inverse problem for SEP propagation and generation in the inner Heliosphere, 1. The case of isotropic diffusion, Paper on COSPAR 2006, Session

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[3]. Lev I. Dorman and David S. Applbaum, The inverse problem for SEP propagation and generation in the inner Heliosphere, 2. The case of anisotropic diffusion, Paper on COSPAR 2006, Session D2.4/E3.4, A-02039.